

ENERGY RESEARCH, INC.

GENERAL SERVICES ADMINISTRATION Federal Supply Service

Authorized Federal Supply Schedule Price List

Price List Current as of Modification #PS-A812, effective 5/12/2020

On-line access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order are available through GSA-*Advantage!*[™], a menu-driven database system. The INTERNET address GSA-*Advantage!*[™] is: <http://www.GSAAdvantage.gov>

Schedule Title: Multiple Award Schedule (MAS)

FSC Group: Professional Services

Product Service Code: R425

For more information on ordering from Federal Supply Schedules, click on the FSS Schedules button at <http://www.fss.gsa.gov>

Contract Number: GS-23F-0110M

Contract Period: February 28, 2002 through February 27, 2022

Contractor Name and Mailing Address:

Energy Research, Inc.

P.O. Box 2034

Rockville, MD 20847

Contractor Physical Address:

Energy Research, Inc.

6189 Executive Blvd.

Rockville, MD 20852

Contractor Phone Number: (301) 881-0866

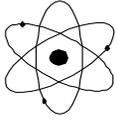
Contractor Fax Number: (301) 881-0867

Contractor Website: <http://www.eri-world.com>

Point of Contact: Mohsen Khatib-Rahbar, President
Tracey Mullinix, Contract Administrator

Business Size: Small Business

Prices Shown Herein are Net (Discount Deducted)



Terms and Conditions:

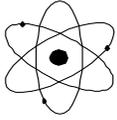
- 1a. Awarded Special Item Numbers (SINs):
 SIN 541330ENG Engineering Services A-2
 SIN 541380 Testing Laboratories A-2
 SIN 541420 Engineering System Design and Integration Services..... A-2
 SIN 541715 Engineering Research and Development and Strategic Planning . A-2
 SIN OLM Order-Level Materials A-2

For further information regarding corporate experience and areas of expertise related to a specific SIN, please see Appendix A.

- 1b. Labor Categories and Prices for Fiscal Years 2020-2022 for all Special Item Numbers:

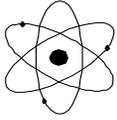
Labor Category	Year 19	Year 20
	2/28/2020 to	2/28/2021 to
	2/27/2021	2/27/2022
Executive	\$209.26	\$214.91
Executive Engineer/Scientist	\$191.87	\$197.05
Senior Corporate Engineer/Scientist	\$159.21	\$163.51
Corporate Engineer/Scientist	\$143.49	\$147.36
Senior Scientist/Engineer	\$115.65	\$118.77
Engineer/Scientist	\$85.53	\$87.84
System Analyst	\$80.08	\$82.24
Support Staff	\$68.10	\$69.94
Senior Consulting Engineer	\$248.83	\$255.55
Executive Consulting Engineer	\$336.60	\$345.68

- 1c. For further information regarding definition of labor categories, please see Appendix A, page A-6.
2. Maximum Order: \$1,000,000.00.
 3. Minimum Order: \$100.00.
 4. Geographic Coverage (Delivery Area): Worldwide.
 5. Point of Production: Rockville, Maryland, United States of America.
 6. Statement of Net Prices: Prices quoted are net (discount already deducted).
 7. Quantity Discounts: None.



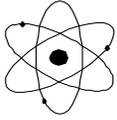
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8. Prompt Payment Terms/Discount: None. Net 30 Days. Information for Ordering Offices: Prompt payment terms cannot be negotiated out of the contractual agreement in exchange for other concessions.
- 9a. Government purchase cards are accepted up to the micro-purchase threshold.
- 9b. Government purchase cards are not accepted above the micro-purchase threshold.
10. Foreign Items (list items by country of origin): None.
- 11a. Time of delivery: Will be stated in any resulting purchase order.
- 11b. Expedited delivery: not applicable.
- 11c. Overnight and 2-day delivery: not applicable.
- 11d. Urgent requirements: not applicable.
12. FOB Point: Destination.
- 13a. Ordering Address:
Energy Research, Inc.
P.O. Box 2034
Rockville, MD 20847
- 13b. Ordering Procedures: For supplies and services, the ordering procedures and information on Blanket Purchase Agreements (BPAs) are found in Federal Acquisition Regulation (FAR) 8.405-3.
14. Payment Address:
Energy Research, Inc.
P.O. Box 2034
Rockville, MD 20847
15. Warranty Provision: The Contractor warrants and implies the items delivered hereunder are fit for use for the particular purpose described in this contract.
16. Export Packing Charges: If packing is necessary, Contractor will charge ordering agency for any items shipped with a courier (i.e., Fedex, UPS) at cost.
17. Terms and Conditions of Government purchase card acceptance (any thresholds above the micro-purchase level): None.
18. Terms and conditions of rental, maintenance and repair: not applicable.

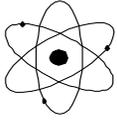


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19. Terms and conditions of installation: not applicable.
- 20a. Terms and conditions or repair parts: not applicable.
- 20b. Terms and conditions for any other services: not applicable.
21. List of service and distribution points: not applicable.
22. List of participating dealers: not applicable.
23. Preventive maintenance: not applicable.
- 24a. Environmental attributes (e.g., recycled content energy efficiency and/or reduced pollutants): not applicable.
- 24b. Section 508 compliance information: Not applicable.
25. Data Universal Number System (DUNS) number: 62-121-1259.
26. Notification regarding registration in System for Award Management (SAM) database: Active.



**APPENDIX A: PRIMARY ENGINEERING DISCIPLINE,
CORPORATE EXPERIENCE AND AREAS OF EXPERTISE**



Primary Engineering Discipline: Mechanical.

Subdisciplines: Nuclear Engineering, Design Engineering, Heat Transfer, Safety Engineering, and Risk Assessment

Company Overview:

Energy Research, Inc. (ERI) is a Maryland-based, international scientific, engineering and technology company. The company services include engineering analysis, management consulting, and scientific research in nuclear energy, conventional energy, risk management, probabilistic risk assessment and environmental systems.

ERI was founded in April 1989, and over the last 30 years, ERI has become internationally recognized in (1) probabilistic risk analysis, (2) nuclear reactor safety; (3) space system safety and risk assessment; (4) environmental hazard assessment for nuclear and non-nuclear systems; (5) accident consequence modeling and assessment of emergency planning strategies; (6) accident precursor studies and event analysis; (7) severe accident & safety analysis; (8) computer code development, experimental assessment and application to complex systems; (9) heat transfer and fluid dynamics; (10) on-line and off-line diagnostics of complex systems; (11) design and concept assessment; (12) training and infrastructure development; (13) database development; (14) information technology and interactive training material; (15) performance indicators and assessment of organizational safety culture; (16) regulatory review and evaluation studies; (17) peer review of complex issues; and (18) policy development and development of implementation guidelines.

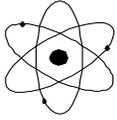
ERI has served various U.S. (and European) Government agencies, and international organizations, these include (1) U. S. Nuclear Regulatory Commission (NRC), (2) U. S. Department of Energy (DOE), (4) Pacific Northwest National Laboratory (PNNL), (5) Los Alamos National Laboratory (LANL), (6) Swiss Federal Nuclear Safety Inspectorate (HSK), (7) Finnish Center for Radiation and Nuclear Safety (STUK), (8) International Atomic Energy Agency (IAEA), and (9) the Swedish Nuclear Power Inspectorate (SKI).

Areas of Expertise/Description of Services Relevant to Specific Special Item Numbers:

SIN 541330ENG ENGINEERING SERVICES

Strategic Planning for Technology Programs/Activities

Strategic planning for technology related program, including training for infrastructure development, organizational performance, and special studies, are among the important areas of activities at Energy Research, Inc. This includes implementation and management of major studies at other organizations, starting from an elementary training level, eventually leading to major studies, or conduct of courses and lectures.

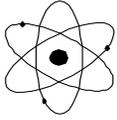


Since mid 1990s, ERI has served as the prime contractor to the Swiss Federal Nuclear Safety Inspectorate (HSK) in implementing the Swiss technical assistance programs to Russia, Ukraine and Slovakia. These programs all share the same common objectives as developed and implemented by ERI. These include (1) the development of strategic plans for transfer of advance technology for use in safety analysis and safety upgrading of Soviet-designed and constructed nuclear power plants in the countries of the former Soviet Union (i.e., Russia, Ukraine and Slovakia); (2) the development of comprehensive staff recruiting and training program in the performance of modern safety assessment studies for nuclear power plants, including both deterministic and probabilistic analyses; (3) the development of a framework for sustainable nuclear regulatory safety program to directly support the regulatory authorities in Ukraine and Slovakia; (4) support in the development of infrastructure and organizational performance assessment programs in Slovak and Ukrainian nuclear regulatory organizations; and (5) case studies as a means for hands-on staff training, including performance of a plant-specific Probabilistic Safety Assessment (PSA) for Bohunice nuclear power plant. This study is serving as a “reference study” for assessment of vulnerabilities for VVER-440/213 plants in Slovakia. The ERI approach to these tasks has consisted of three main elements, namely: (1) development of necessary guidelines, (2) development of procedures for transfer of technology and training, and (3) implementation of the various guidelines and procedures. For example, as part of the SWISSUP training program in Ukraine, ERI staff developed a procedural framework for introduction of modifications in the Ukrainian nuclear power regulations for reporting of operational events, and for the assessment of licensee safety performance using a risk-guided approach. The safety performance indicator effort also resulted in the development of a “performance tracking system” for use by the Ukrainian Administration for Nuclear Regulatory Safety to track the performance of various nuclear power plants in Ukraine. Similar tasks, as related to strategic planning infrastructure development, have been accomplished for other programs in Russia and Slovakia.

Concept Development and Requirements Analysis

The SMART concept developed by ERI as part of a competitive grant by U.S. Department of Energy, utilizes an innovative BWR design characterized by a large volume containment that is more typical of pressurized water reactors. The use of a BWR design reduces the overall system complexity, and eliminates the need for a secondary steam production system (i.e., steam generators), thereby reducing the overall cost, which should offset the additional cost for construction of a stronger containment.

ERI used state-of-the art computer codes to design the SMART core, containment and safety systems following an innovative concept that uses either low-enrichment uranium or a mixture of low-enrichment uranium and thorium. Both fuels are relatively proliferation-resistant, and in conjunction with advanced fuel pin and core materials, the current design would allow continued operation (with provisions for on-line maintenance) for periods exceeding 10 years, without refueling. The SMART Emergency Core Cooling System and the containment heat removal system are based on a simple



concept using passive natural circulation of water for emergency core cooling, and air flow (aided by evaporative cooling at higher than 100 MW(e) power) for containment heat removal.

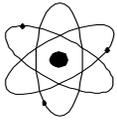
The feedwater system is designed to achieve the desired recirculation, core cooling and power production without the need for internal jet and external recirculation pumps. SMART is equipped with a Core Automatic Depressurization System (CADS). Reactor pressure control system design uses relief valves which discharge through spargers submerged in a large In-Containment Water Pool (ICWP). The same discharge lines were designed for use in automatic depressurization of the vessel during accidents. The borated water contents of the ICWP will also be used to reflood the vessel (by gravity) once it has depressurized, as well as to flood the reactor cavity/pedestal region (for vessel lower head cooling), in case of severe accidents. The SMART design was also guided by risk-informed process that aimed at eliminating the deficiencies in the current generation designs through simplifications and innovation to meet the Nuclear Regulatory Commission licensing requirements.

The design feasibility studies were also performed by ERI to demonstrate (1) the overall feasibility of SMART; (2) the achievement of very long fuel operating cycles; (3) relatively slow progression of accidents/events in SMART; and (4) effectiveness of the various engineered systems (ECCS and the passive containment heat removal system). In addition, the preliminary design was subjected to a quality assurance, and an independent (outside of ERI) peer review to ensure overall quality control and acceptability by DOE.

System Design, Engineering and Integration

Energy Research, Inc. (ERI) has been supporting the Swiss Federal Nuclear Safety Inspectorate (HSK) since 1990, in their regulatory evaluation of the Probabilistic Safety Assessments (PSAs) for all the Swiss nuclear power plants. This work that is a continuation of the ERI support to HSK and consists of (1) development of living regulatory PSA models for all Swiss nuclear power plants; (2) review of plant-specific PSAs; (3) evaluation of risk-informed plant-specific applications to the licensing arena; (4) risk-based analysis of operational events and accident precursor studies; (5) support in the development of risk criteria for regulatory decision-making; and (6) analysis of severe accidents and integration into level-2 PSA models.

A living PSA model for the Mühleberg (a General Electric Boiling Water Reactor [BWR-4] with MARK-I containment) nuclear power plant in Switzerland is being developed using a fault tree linking methodology. This includes the development of various logic models for the frontline and support systems, analysis of random and common-cause failure data, human reliability and operator actions, assessment of system success criteria, and development of functional system event trees. In addition, deterministic and engineering calculations (i.e., using ADAM and MELCOR computer codes) are performed to support the assessment of the likelihood of containment failure and



radiological releases to the environment. This includes the development of several computer codes (ERPRABURN, ERPRAST, ERPRARISK) by ERI staff that are used in the risk quantification process. In addition, ERI has developed an approach for assessment of potential risk impact of severe accident management guidelines, using the concept of risk of activity of release. In this approach, the radioactive decay and transmutation of 54 risk-dominant radionuclides are calculated for each release bin, and included in the risk integration process. This ERI-developed methodology is considered as state-of-the-art for application of risk analysis to regulatory decision-making process. This study is being performed under a very strict HSK guideline for quality assurance, and involves several stages of independent review to ensure the overall quality.

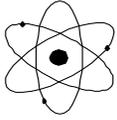
During the current calendar year, ERI has developed an approach to evaluate the risk significance of various plant-specific events as reported in the various Licensee Event Reports (LERs) during calendar year 2000. This approach is expected to become the basis for an annual evaluation of the LERs and to track licensee performance for various Swiss nuclear power plants.

Test and Evaluation

In 1992 ERI was awarded two contracts, on open competition basis, to support NRC in the area of “phenomena assessment” and “computer code assessment” for advanced Light Water Reactors (ALWRs). These contracts (completed in 1999) encompassed a multitude of tasks focused on thermal and transport processes associated with ALWRs. Example tasks included (1) CORCON-Mod3 Independent Assessment, Validation and Sensitivity Analysis; (2) MELCOR Code Assessment; (3) Phenomenological Model Review; (4) Fuel-Coolant-Interactions (Steam Explosions); (5) MELCOR (Computer Code) BWR Thermal-Hydraulic Assessment; (6) Independent Assessment of the NRC Sponsored Codes; (7) Further Sensitivity of MELCOR Results to Heat and Mass Transfer Correlations for an ATWS Scenario; (8) Independent Assessment of ALWR Containment Performance; (9) Independent Assessment of Direct Containment Heating Research; and (10) Independent Scaling Rationale for ALWR Containment Testing Programs.

ERI developed Phenomena Identification and Ranking Tables (PIRT), and the conservation laws and closure relations were utilized to develop an independent scaling rationale that was used to assess the Westinghouse containment testing (i.e., small scale and 1/8-scale tests), and the GE SBWR large-scale testing program at the Paul Scherrer Institute. This study became the basis for NRC’s review of the AP-600 submittal for passive containment cooling system. In addition, ERI together with Purdue University developed models for study of instabilities under natural circulation conditions in the annular region of the AP-600 containment. Furthermore, ERI supported NRC in the independent peer review of various Westinghouse submittals dealing with evaporative cooling of the containment shell.

In addition, ERI also developed an approach to assess the energetic steam explosions in the containment cavity following reactor pressure vessel failure. The ERI approach used



the results of an ERI-developed two-dimensional model for heat transfer to the lower head leading to the formation of a crust and thermal attack of the lower head at the point where crust is expected to disappear. Furthermore, the initial and boundary conditions for the available melt mass, and pour location into the cavity, were formulated and used to calculate the dynamic impulse loads on the cavity walls and the vessel boundaries using the one dimensional TEXAS, and two-dimensional PM-ALPHA /ESPROSE and IFCI computer codes.

In addition, ERI provided support to NRC in experimental assessment and independent peer review of various severe accident issues (combustion, lower head failure, etc.), and computer codes available for safety and severe accident analysis.

Definitions of Labor Categories:

Category A - Executive

Minimum of 10 years of experience in directing government or corporate applied research and development programs. Ph.D. degree in Science or Engineering and extensive international peer recognition (e.g., extensive publications in peer-reviewed journals and/or conference proceedings and membership in international expert groups) required. Demonstrated ability to represent the company in all technical and administrative matters domestically and internationally.

Functions & Responsibilities

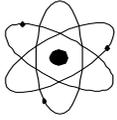
Executes day-to-day activities of the company, represents the company in all external interactions with others, and leading and responsible for approving deliverables, proposals, presentations, financial, administrative and management matters.

Category B – Executive Engineer/Scientist

Minimum of 10 years of experience in performing applied research and/or teaching, including at least 5 years of project management experience in various technical support activities and independent problem solving tasks related to various scientific and engineering disciplines. M.S. or Ph.D. degree in Science or Engineering and extensive peer recognition (e.g., publications in peer-reviewed journals and/or conference proceedings) required.

Functions & Responsibilities

Leads specific technical and non-technical activities of the company, represents the company in specific areas in external interactions with others, and responsible for specific technical matters, including preparation of technical proposals.



Category C – Senior Corporate Engineer/Scientist

Minimum of 10 years of experience in performing applied research, including at least 3 years of project management experience in various technical support activities and independent problem solving tasks related to various scientific and engineering disciplines. M.S. or Ph.D. degree in Science or Engineering and extensive peer recognition (e.g., publications in peer-reviewed journals and/or conference proceedings) required.

Functions & Responsibilities

Leads specific technical activities of specific projects, technical inter actions in specific areas with others, and responsible for specific technical matters, including technical contributions to proposals.

Category D – Corporate Engineer/Scientist

Minimum of 10 years of experience in performing applied research, including at least 1 year of project management experience in various technical support activities and independent problem solving tasks related to various scientific and engineering disciplines. M.S. or Ph.D. degree in Science or Engineering and extensive peer recognition (e.g., publications in peer-reviewed journals and/or conference proceedings) required.

Functions & Responsibilities

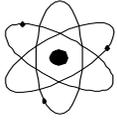
Leads specific technical tasks in areas of his/her expertise, participates in technical interactions in specific areas with others, and responsible for coordination of specific technical matters, including coordination of technical contributions to proposals in area relevant to his/her expertise.

Category E - Senior Engineer/Scientist

Minimum of 8 years of experience in performing applied research and/or participating in a leading role, in various technical support activities and independent problem solving tasks related to various scientific and engineering disciplines. M.S. or Ph.D. degree in Science or Engineering and extensive peer recognition (e.g., publications in peer-reviewed journals and/or conference proceedings) required.

Functions & Responsibilities

Performs advanced analyses in areas of his/her expertise, participates in technical interactions in specific areas with others at the company, and provides inputs to technical proposals in area relevant to his/her expertise.



Category F - Engineer/Scientist

Minimum of 3 years of experience in performing applied research and/or participating in various technical support activities and problem solving tasks related to various scientific and engineering disciplines. M.S. or Ph.D. degree in Science or Engineering is required.

Functions & Responsibilities

Performs engineering analyses in areas of his/her expertise, participates in technical interactions in specific areas with others at the company, and develops new skills in technical research and analyses.

Category G - System Analyst

Ability to participate in technical support and applied research programs dealing with various engineering discipline. Requires a minimum of 5 years of extensive knowledge of modern computer hardware and computer programming. B.S. degree in Computer Science, Physics or Engineering is required.

Functions & Responsibilities

Responsible for development of software, and designing and implementing hardware relative to the needs of the company, including computer system protection and security.

Category H - Support Staff

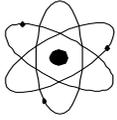
Requires experience in spreadsheet programming, word processing, and application of graphics programs. Ability to collect and track project cost and quality assurance programs. Administrative and office management skills essential but not required. B.S./B.A. degree in Biology, Chemistry, Operations Research, Business Administration or other related fields or a minimum of 3 years of job experience required.

Functions & Responsibilities

Responsible for contract administration, preparing cost proposals, overseeing invoicing, progress reporting, tracking project costs, vacation schedules, report formatting/quality assurance and all other office administration management.

Category I - Senior Consulting Engineer

Minimum of 20 years of experience in directing government, corporate, and/or university applied research and development programs. M.S. or Ph.D. degree and extensive international peer recognition (e.g., extensive publications in peer-reviewed journals and/or conference proceedings and membership in international expert groups) required.



Demonstrated ability to do independent research and/or consulting work, including serving on high level review panels.

Functions & Responsibilities

Provides technical support and guidance in highly advanced areas of scientific and engineering disciplines. Responsible for development of advanced analysis methods.

Category J – Executive Consulting Engineer

Minimum of 25 years of experience in managing and directing government, corporate, and/or university applied research and development programs. M.S. or Ph.D. degree with extensive international peer recognition (e.g., extensive publications in peer-reviewed journals and/or conference proceedings and membership in international expert groups) required. Demonstrated ability to do independent research and/or consulting work, including serving on high-level review panels for the government and/or industry.

Functions & Responsibilities

Represents the company in participating in highly focused technical areas in peer review committees. Responsible for developing new and unique analysis methods based on his/her knowledge of state-of-the-art techniques.